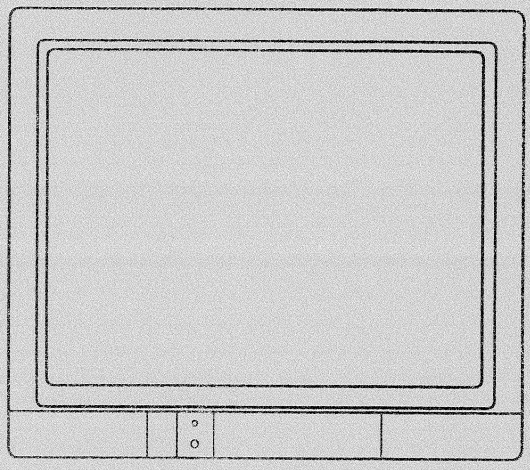
SERV 4784

Jan 1996

MITSUBISHI

Service Manual

Colour TV

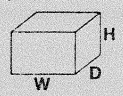


Models

CT-21M5G
CT-21M5GT
CT-21M5S
CT-21M5ST
CT-21M5YT
CT-25M5BT

SPECIFICATIONS

Reception System	CCIR-I PAL
Reception Frequency	UHF: 470MHz~862MHz
	VHF: 47~170MHz (VB1), 170~448MHz (VB2)
Mains Input	AC 230V 50Hz
Power Consumption	88W (to IEC65 – 21M5G, 21M5S)
	90W (to IEC65 – 21M5GT, 21M5ST)
	80W (21M5YT)
Aerial Input	75 ohm
Intermediate Frequency	Video 38.9MHz
	Sound 33.4MHz
Audio Output	5W (Music Power)
Speaker	100mm round
Chassis	EE4
Picture Tube	A51EFS43X09 51cm(V), 90° deflection
Cabinet dimensions	497mm x 485mm x 448mm
	(approx. W x D x H)
Weight	approx. 21Kg



MITSUBISHI ELECTRIC CORPORATION

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1 GENERAL NOTES

1.1 SAFETY PRECAUTIONS

1.1.1 General Warnings

1. Observe any cautions and safety related notes located inside the receiver cabinet and on the receiver chassis.
2. An isolation transformer should be used between the television receiver and the AC power supply point before any test or servicing is performed on a LIVE chassis television receiver.
3. Operation of these receivers outside the cabinet or with the back cover removed involves a shock hazard from the receiver power supplies. Work on the receiver should not be attempted by anyone who is not familiar with the precautions necessary when working on high voltage equipment.
4. Do not install, remove or handle the picture tube in way unless shatter-proof goggles are worn. People not so equipped should be kept away while the picture tube is being handled. Keep the picture tube away from the body while handling.
5. When service is required, observe the original lead dressing. Extra precaution should be given to assure correct lead dressing in the high voltage area. Where a short-circuit has occurred, replace those components that indicate evidence of overheating.

1.1.2 X-RAY Warning

Under fault conditions the CRT can generate X-rays. The use of a lead apron is recommended if available.

When replacing the CRT only use the designated replacement part as it is a critical component with regard to X-rays. No high-voltage adjustments are provided.

1.1.3 Leakage Current Check

Before returning the receiver to the customer it is recommended that the leakage current be measured according to the following method:

With the AC plug removed from the AC source, place a jumper across the live and neutral pins. Turn the receiver AC switch on. Using an OHM-METER, connect one lead to the shorted AC plug and touch the other lead to each exposed metal part (antennas, screw heads, etc.) in turn, particularly any exposed metal part having a return path to the chassis. Any resistance below a value of 1 MEG OHM indicates an abnormality which requires corrective action.

1.2 CONTROLS AND CONNECTORS

1.2.1 Front Panel

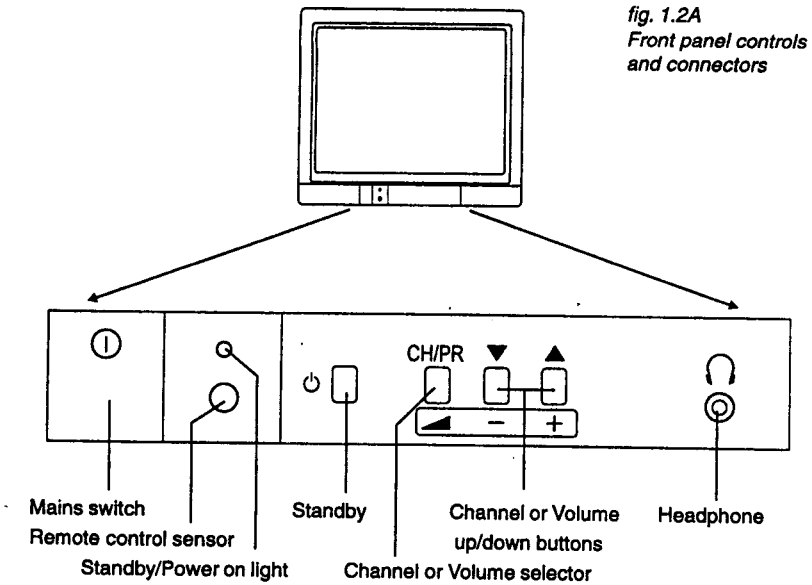


fig. 1.2A
Front panel controls and connectors

1.2.2 Rear Panel

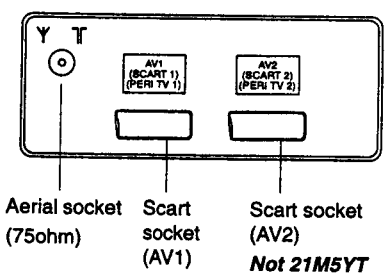
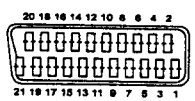


fig. 1.2B Rear panel connectors



Pin	AV1	AV2
1	Audio out – R	Audio out – R
2	Audio in – R	Audio in – R
3	Audio out – L	Audio out – L
4	Audio earth	Audio earth
5	Blue earth	Earth
6	Audio in – L	Audio in – L
7	Blue in	Not connected
8	Function switch	Function switch
9	Green earth	Earth
10	Not connected	Not connected
11	Green in	Not connected
12	Not connected	Not connected
13	Red earth	Chroma earth
14	Blanking earth	Earth
15	Red in	Chroma in
16	RGB blanking	Not connected
17	Video out earth	Video out earth
18	Video in earth	Y earth
19	Video out	Video out
20	Video in	Y in
21	Socket earth	Socket earth

fig. 1.2C Scart socket pin details

1.3 REQUIRED EQUIPMENT

1.3.1 Measuring equipment

- Oscilloscope
- Signal generator
- DC milliammeter
- DC voltmeter
- Frequency counter (optional)

1.3.2 Test signals

- PAL Cross-hatch
- PAL Monoscope (or a VCR playing a monoscope alignment tape)
- PAL Colour-bar with the specification as in figure 1.3A below:

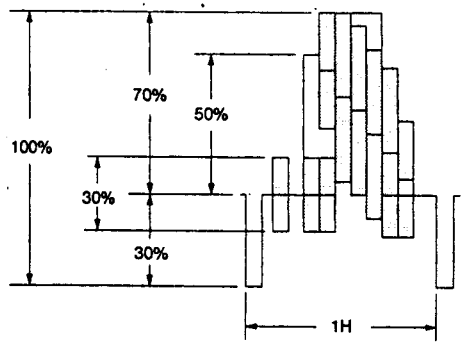


fig. 1.3A Split-field colour bars (with 100% window)

1.4 CONNECTING LEADS

1.4.1 Identification

Connecting leads are identified by the colours of their wires according to figure 1.4A below:

Colour	Code
BLACK	A
BROWN	B
RED	C
ORANGE	D
YELLOW	E
GREEN	not used (earth)
BLUE	G
VIOLET	H
GREY	J
WHITE	K
PINK	L

Example:

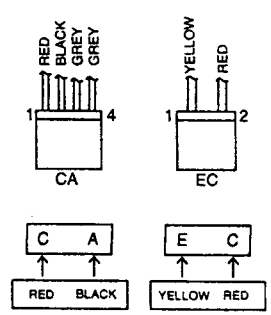


fig. 1.4A Connecting lead identification chart

1.4.2 Lead dressing

Leads must be dressed as shown in table 1.4B and the diagram (fig. 1.4C) below. The leads are routed or clamped so that they do not come close to any heat generating or high-tension parts.

The anode lead wire is routed such no tension is applied to the anode cap. If the mounting angle of the anode cap and the route of the anode lead wires are changed, return them to the initial angle and route.

CLAMP	LEAD	SPECIAL INSTRUCTIONS
1	KB, KK	
2	DY	
3	DY, Tuner earth	Make a loop in Tuner earth to take up any slack.
4	GA	Make a loop in GA to take up any slack.
5	GA	
6	LB	
7	GA	
8	LB, SB, Focus, Tuner earth	Make a loop in LB to take up any slack.

table 1.4B Lead-dressing table.

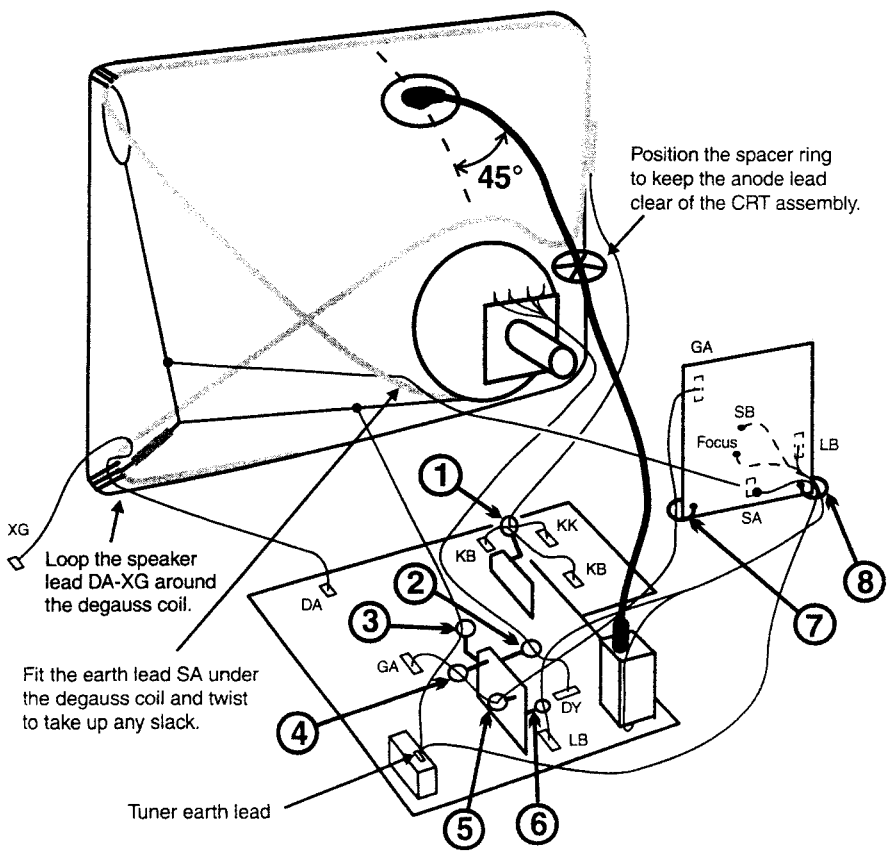


fig. 1.4C Lead-dressing diagram.

2 SERVICE ADJUSTMENT PROCEDURES

2.1 INTRODUCTION

Most service adjustments to these models are made using the remote control (figure 2.1A) with the TV in service mode. The adjustment data is stored in an EEPROM.

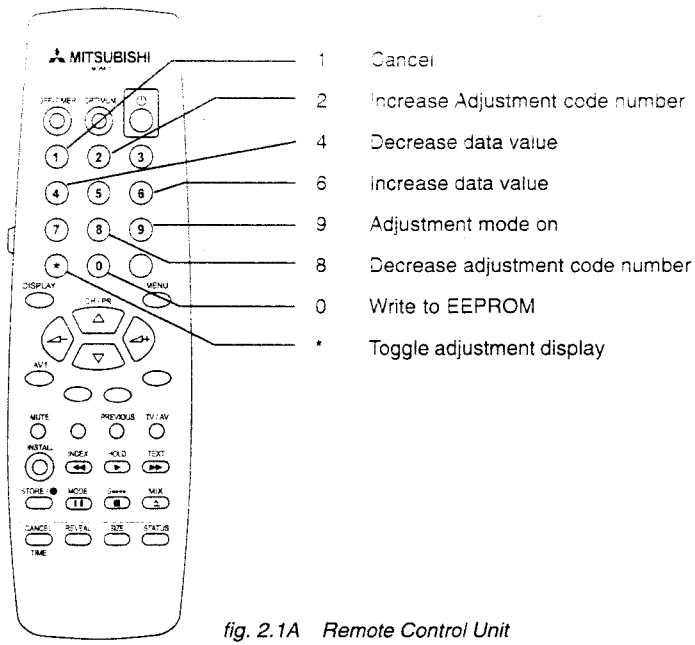


fig. 2.1A Remote Control Unit

2.1.1 Basic adjustment procedure

1. Turn the power on. With a small screwdriver, press the Service switch (S701, next to the aerial socket) and then button "9" within 5 seconds to enter service mode.
2. Press the * button to select either the VCJ or OPTION adjustment display (figs. 2.1B and C).

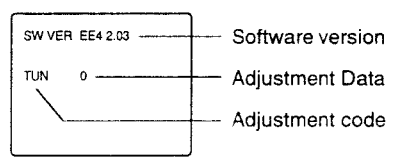


fig. 2.1B Options adjustment display

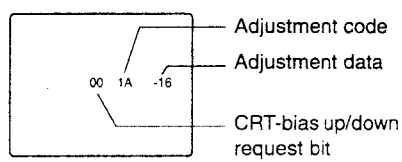


fig. 2.1C VCJ adjustment display

3. Press buttons "2" or "8" to increase or decrease the adjustment code number.
4. Press buttons "6" or "4" to increase or decrease the data value.
5. After completing your adjustments, press button "0" to write the adjustment data to the EEPROM.

   To cancel a change, press button "1" (or the Standby button) before writing the adjustment to the EEPROM. All data adjusted since the last EEPROM write will be reset.

2.2 INITIALISING THE EEPROM

If you have replaced the EEPROM (IC702) or if for any reason the adjustment data has become corrupted it will be necessary to initialise the EEPROM.

2.2.1 Initialsing the EEPROM

1. If necessary, switch off by the Main switch.
2. Hold in the service switch (S701, next to the aerial socket) while switching on by the Main switch.
3. Release the service switch after 3 seconds.
4. Switch off by the Main switch.
   The EEPROM data values have now all been reset to their initial default values as shown in table 2.2C.
5. Switch on by the Main switch. Press the Service switch and then button "9" within 5 seconds to enter service mode.
6. Press the * button to select the OPTIONS adjustment display.
7. Press buttons "2" or "8" on the remote control to select the adjustment code.
8. Adjust the data value for each code using buttons "2" or "4" on the remote control according to table 2.2A below:

   (Other adjustment codes may be displayed but are not applicable to these models.)

CODE:	TUN	ATS	STD	SYS	AVI	EEP	TXT	FFT	HTL
CT-21M5G	1	0	0	1	1	0	0	0	1
CT-21M5GT	1	1	0	1	1	0	1	0	1
CT-21M5S	1	0	0	1	1	1	0	0	1
CT-21M5ST	1	0	0	1	1	1	2	1	1
CT-21M5YT	1	0	0	0	0	0	2	1	1

table 2.2A Data values for the OPTIONS adjustments.

9. Press the "0" button to write the changes to the EEPROM.
10. Press the * button to select the VCJ adjustment display.
11. Press buttons "2" or "8" on the remote control to select the adjustment code.
12. Adjust the data value of each code using buttons "2" or "4" on the remote control according to table 2.2B below:

    (Other adjustment codes will be displayed but the default values need not be changed.)

CODE:	07	11	12	19	1B	1C
SETTING:	-7	001	111	-3	-11	00

table 2.2B Data values for the VCJ adjustments.

13. Press the "0" button to write the changes to the EEPROM.

2.2.2 EEPROM Default data values.

These values are adequate to allow the set to be adjusted.

VCJ data values			OPTIONS data values		
CODE	FUNCTION	DATA VALUE	ITEM	DECRIPTION	DATA VALUE
00	V-AMP	-16	TUN	TUNER TYPE	0
01	V-CORRECT	-31	SAT	SATELLITE ENABLE	-
02	P-AMP	-05	AUD	AUDIO SYSTEM	-
03	TILT	-12	ATS	AUTO TUNING SORT	0
04	V-LIN	-23	STD	RECEPTION STANDARD	0
05	C-CORRECT	-09	SYS	COLOUR SYSTEM	0
06	H-AMP	-22	AV1	NO. OF AV INPUTS	0
07	16x9 - SW.RGB-MATRIX	-7	AVD	AV DUBBING	-
08	V-SHIFT	+02	EEX	CHASSIS TYPE	-
09	H-PHASE	+10	SPK	SPEAKER SW ENABLED	-
0A	B-DRIVE	+01	EEP	EEPROM SIZE	1
0B	G-DRIVE	+01	TXT	TELETEXT TYPE	0
0C	R-DRIVE	+01	FFT	FAST / TOP TEXT	0
0D	CONTRAST	+14	HTL	HOTEL MODE ENABLE	1
0E	BRIGHT	+01			
0F	COLOUR-SAT	+10			
10	NTSC-TINT	00			
11	SHARP	111			
12	PAL-LUMA-DELAY	111			
13	SECAM-LUMA-DELAY	111			
14	V-AMP-60	00			
15	P-AMP	00			
16	H-AMP-60	00			
17	V-SHIFT-60	00			
18	H-PHASE-60	00			
19	H-PHASE-TEXT	00			
1A	H-PHASE-SECAM	00			
1B	H-PHASE-RGB	00			
1C	P-AMP-16 : 9	00			
1D	358NTSC-LUMA-DELAY	111			
1E	443NTSC-LUMA-DELAY	111			

table 2.2C EEPROM Default data values.

2.3 VIF CIRCUITS

2.3.1 RF-AGC

VR101 (adjacent to the tuner)

1. Connect an RF signal such as an off-air broadcast.
2. Check the AFT is on for the current channel.
3. Adjust VR101 so that the picture and sound exhibit no noise, beat or intermodulation distortion.

2.4 DEFLECTION CIRCUITS

2.4.1 Important notes

Before making any adjustments, if you have changed the CRT, FLYBACK TRANSFORMER or made any changes in the deflection circuits; adjust the CRT bias as described in 2.6.1 steps 1 ~ 6 (*Video Circuits – Screen control*).

Check the VERTICAL BREATHING CORRECTION as follows:

1. Select the VCJ adjustment display.
2. Set the adjustment code to "01" with buttons "2" or "8" on the remote control.
3. If neccessary, adjust the data value to "-31" using buttons "4" or "6" on the remote control.

2.4.2 Horizontal centre

Code 09 (H-PHASE)

1. Connect a VCR and play a PAL-Monoscope alignment tape.
2. Select the VCJ adjustment display.
3. Set the adjustment code to "09" with buttons "2" or "8" on the remote control.
4. Adjust the horizontal position with buttons "4" or "6" on the remote control.

2.4.3 Height and linearity

Code 00 (V-AMP)
Code 04 (V-LIN)

1. Connect a VCR and play a PAL-Monoscope alignment tape.
2. Select the VCJ adjustment display.
3. Set the adjustment code to "00" (V-AMP) with buttons "2" or "8" on the remote control.
4. Adjust the circle to a true circle with buttons "4" or "6" on the remote control.
5. Set the adjustment code to "04" (V-LIN) with buttons "2" or "8" on the remote control.
6. Adjust the linearity to be the same for the top and bottom halves of the circle using buttons "4" or "6" on the remote control.
7. Set the adjustment code to "00" (V-AMP) with buttons "2" or "8" on the remote control.
8. Re-adjust V-AMP with buttons "4" or "6".
9. Repeat the steps above, if necessary.

2.4.4 Vertical centre

Code 08 (V-SHIFT)

1. Connect a VCR and play a PAL-Monoscope alignment tape.
2. Select the VCJ adjustment display.
3. Set the adjustment code to "08" (V-SHIFT) with buttons "2" or "8" on the remote control.
4. Adjust the centre line of picture to be within +/- 3mm from the vertical centre on the screen using buttons "4" or "6" on the remote control.

2.4.5 60Hz Defection circuit offsets

Code 14 (V-AMP 60)
Code 15 (P-AMP 60)
Code 16 (H-AMP 60)
Code 17 (V-SHIFT 60)
Code 18 (H-PHASE 60)

1. Connect an RF 60Hz Cross-hatch signal.
2. Select the VCJ adjustment display.
3. Select each adjustment code in turn with buttons "2" or "8" on the remote control and adjust each item to the figures shown in table 2.4C below using buttons "4" or "6" on the remote control.

CODE	14	15	16	17	18
SETTING	+6	-	-	+6	-6

table 2.4C 60Hz adjustment offsets

2.5 CRT CIRCUITS

2.5.1 White balance

Code 0A (B-DRIVE)
Code 0B (G-DRIVE)
Code 0C (R-DRIVE)

1. Connect a VCR and play a PAL-Monoscope alignment tape.
2. Select the VCJ adjustment display.
3. Set the adjustment codes to "0A", "0B" and "0C" in turn and pre-adjust each to "0".
4. Adjust codes "0A" and "0C" to adjust the white balance.

2.5.2 Focus

FOCUS control on the Flyback Transformer

1. Connect an RF signal such as an off-air broadcast.
2. Adjust the FOCUS control for the best overall focus.

2.6 VIDEO CIRCUITS

Perform the following adjustments after adjusting the Deflection circuits. Allow the TV to warm up for 20 minutes before proceeding

2.6.1 Brightness and Contrast

SCREEN control on the Flyback Transformer
Code 0F (COLOUR SATURATION)
Code 0E (BRIGHTNESS)
Code 0D (CONTRAST)
BEAM CURRENT (using connector TP adjacent to the Flyback Transformer)

1. Connect an RF Cross-hatch signal.
2. Select the VCJ adjustment display.
3. Make sure that the Screen Up/Down Request Bit is set to "00". If not, adjust the SCREEN control on the Flyback Transformer.
4. Change the external signal to a Colour-bar.
5. Readjust the SCREEN control to give "00".
6. Repeat steps 1 to 5 until the Screen Up/Down Request Bit is "00" for both signals.
7. Connect an RF Colour-bar signal.
8. Set the adjustment code to "0F" with buttons "2" or "8" on the remote control.
9. Adjust the data value to "-32" with buttons "4" or "6" on the remote control.
10. Set the adjustment code to "0E" with buttons "2" or "8" on the remote control.
11. Adjust using buttons "4" or "6" so that a slight difference in brightness can be seen between blue and black areas.
12. Set the adjustment code to "0D" with the buttons "2" or "8" on the remote control.
13. Connect a DC ammeter's "+" lead to connector TP pin 1 on the MAIN-PCB and the "-" lead to connector TP pin 2.
14. Adjust the beam current using buttons "4" or "6" on the remote control to 750±20μA.
15. Check, and if necessary, re-adjust the BRIGHTNESS, code "0E".
16. Check that the Screen Up/Down Request Bit is "00". If not, repeat steps 1 to 13 above.
17. Now proceed to the Colour Output adjustment.

2.6.2 Colour output

Make this adjustment only after adjusting the White Balance, Brightness and Contrast.

Code 0F (COLOUR SATURATION)

1. Connect an RF Colour-bar signal.
2. Select the VCJ adjustment display.
3. Set the adjustment code to "0F" with buttons "2" or "8" on the remote control.
4. Connect an oscilloscope to the junction of R673 and IC660 Pin 9 (BLUE-OUT) on the CRT PCB).
5. Make adjustments using buttons "4" or "6" on the remote control until the waveform is as shown in figure 2.6A.
6. Increase the resulting data value by five steps.

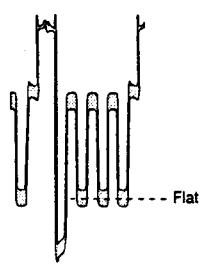


fig. 2.6A

2.7 TELETEXT CIRCUIT

CT-21M5ST and CT-21M5YT only.

2.7.1 Teletext free run frequency

Allow 5 minutes warm-up time before making this adjustment.

L7754

1. Ensure no RF signal is being received.
2. Connect a frequency counter between the L7754 side of C7763 and Ground or a Voltmeter between pin 28 of IC7751 and Ground.
3. Adjust L7754 to give a frequency of 22±0.3MHz or 2.5±0.1V.

2.8 POWER CIRCUIT

2.8.1 B4 Voltage

VR951 (on main PCB next to the SMT)

1. Connect a VCR and play a PAL-Monoscope alignment tape.
2. Push the OPTIMUM button on the remote control.
3. Connect a DC voltmeter's "+" lead to TP91 on the MAIN PCB and the "-" lead to GROUND.
4. Adjust VR951 so that the voltage is 119±2V.

3 PARTS LIST

3.1 NOTES

3.1.1 Model-specific parts

As this service manual covers more than one model, the Service Parts List indicates where certain parts are model-specific. If there is no such indication then the parts are common to *all* models covered by this manual.

3.1.2 Ordering

In order to expedite delivery of replacement parts, please specify:

1. Model number and Serial number
2. Part Number and Description
3. Quantity

Unless full information is provided a delay in execution of the order may result.

3.1.3 Safety

Safety Critical components are indicated thus: ⚠ and must only be replaced with original Mitsubishi parts.

3.1.4 Component tolerances

Component value tolerances are coded as shown in table 3.1A below.

B	C	D	F	G	J	K	M	N	V	X	Z	P	Q
±0.1	±.025	±0.5	±1	±2	±5	±10	±20	±30	+10 -10	+40 -20	+80 -20	+100 -0	+30 -10

table 3.1A Component tolerances

3.2 SERVICE PARTS LIST

SYMBOL No	PART No	PART NAME	DESCRIPTION	MODELS
CRT				
⚠	255P917030	CRT	A51EFS43X09	
IC				
IC101	270P255010	IC	STV8224	
IC201	270P254010	IC	MC44031	
IC202	263P053060	IC	TC4053BP/HEF4053BP	G, GT, S, ST
IC351	270P258010	IC	TDA7253	
IC401	270P261010	IC	TDA8171	
IC501	270P355030	IC	MC7812CT	
IC660	270P207010	IC-CRT-OUTPUT	TEA5101A	
IC701	274P681010	IC	ST9291N6B1NO/B10	G,GT,YT
IC701	274P681020	IC	ST9291N6B1NN/A20	S, ST
IC702	274P684010	IC	ST24C04	S,ST
IC702	274P686010	IC	ST24C08	G,GT,YT
IC7701	274P571030	IC	SAA5281ZP/E	GT
IC7702	274P570020	IC	PCB83C654P	GT
IC7751	274P712010	IC	CF70095ANF	ST, YT
IC7752	274P711010	IC	CF72306	ST, YT
IC901	272P514010	IC	TEA 2261	
IC951	270P260010	IC	TDA8137	
TRANSISTORS				
Q105	260P748030	TRANSISTOR	JC501-R	
Q106	260P749030	TRANSISTOR	JA101-Q	
Q107	260P749030	TRANSISTOR	JA101-Q	
Q108	260P749030	TRANSISTOR	JA101-Q	
Q201	260P748030	TRANSISTOR	JC501-R	G, GT, S, ST
Q202	260P748030	TRANSISTOR	JC501-R	GT
Q253	260P748030	TRANSISTOR	JC501-R	
Q254	260P748030	TRANSISTOR	JC501-R	G, GT, S, ST
Q303	260P748050	TRANSISTOR	JC501-Q	
Q310	260P748030	TRANSISTOR	JC501-R	
Q311	260P748030	TRANSISTOR	JC501-R	G, GT, S, ST
Q312	260P748030	TRANSISTOR	JC501-R	
Q450	260P387010	TRANSISTOR	2SC2236-O,Y	
Q451	260P748030	TRANSISTOR	JC501-R	
Q501	260P748030	TRANSISTOR	JC501-R	
Q551	260P422010	TRANSISTOR	2SC2482	
Q552	260P794010	TRANSISTOR	BU2506	
Q6E7	260P748030	TRANSISTOR	JC501-R	
Q6E8	260C255040	TRANSISTOR	2SA950-Y FORMED	
Q701	260C559050	TRANSISTOR	2SC1740S-E FORMED	
Q703	260P749030	TRANSISTOR	JA101-Q	
Q704	260P748030	TRANSISTOR	JC501-R	G, GT, S, ST
Q705	260P749030	TRANSISTOR	JA101-Q	

SYMBOL No	PART No	PART NAME	DESCRIPTION	MODELS
Q706	260P749030	TRANSISTOR	JA101-Q	
Q707	260P748030	TRANSISTOR	JC501-R	
Q708	260P748030	TRANSISTOR	JC501-R	
Q709	260P748030	TRANSISTOR	JC501-R	
Q710	260P748030	TRANSISTOR	JC501-R	
Q711	260P748030	TRANSISTOR	JC501-R	
Q713	260P748030	TRANSISTOR	JC501-R	
Q714	260P748030	TRANSISTOR	JC501-R	
Q715	260P748030	TRANSISTOR	JC501-R	
Q7751	260P748030	TRANSISTOR	JC501-R	ST, YT
Q7752	260P748030	TRANSISTOR	JC501-R	ST, YT
Q901	261P006010	TRANSISTOR	S2000N	
Q902	260P748030	TRANSISTOR	JC501-R	
Q951	260P748030	TRANSISTOR	JC501-R	
Q952	260P387010	TRANSISTOR	2SC2236-O,Y	
Q953	260P748020	TRANSISTOR	JC501-Q,R	
DIODES				
D201	264P370010	DIODE	1N4148	
D251	264P460020	DIODE	EQA02-05CD/RD5.1 EB1,B2	G, GT, S, ST
D252	264P460020	DIODE	EQA02-05CD/RD5.1 EB1,B2	G, GT, S, ST
D253	264P460020	DIODE	EQA02-05CD/RD5.1 EB1,B2	G, GT, S, ST
D254	264P460020	DIODE	EQA02-05CD/RD5.1 EB1,B2	
D255	264P460020	DIODE	EQA02-05CD/RD5.1 EB1,B2	
D256	264P460020	DIODE	EQA02-05CD/RD5.1 EB1,B2	
D257	264P460020	DIODE	EQA02-05CD/RD5.1 EB1,B2	
D258	264P460020	DIODE	EQA02-05CD/RD5.1 EB1,B2	
D303	264P370010	DIODE	1N4148	
D304	264P370010	DIODE	1N4148	
D401	264P374020	DIODE	1N4003ID	
D501	264P463020	DIODE	EQA02-08C/RD8.2 EB2	
D502	264P370010	DIODE	1N4148	
D503	264P371010	DIODE	BYV95B	
D504	264P371010	DIODE	BYV95B	
D507	264P371010	DIODE	BYV95B	
D508	264P371010	DIODE	BYV95B	
D509	264P371010	DIODE	BYV95B	
D601	264P370010	DIODE	1N4148	
D655	264P370010	DIODE	1N4148	
D656	264P370010	DIODE	1N4148	
D657	264P370010	DIODE	1N4148	
D6A7	264P372010	DIODE	BYV96E	
D701	264P460020	DIODE	EQA02-05CD/RD5.1 EB1,B2	G, GT, S, ST
D702	264P460020	DIODE	EQA02-05CD/RD5.1 EB1,B2	
D703	264P461070	DIODE	EQA02-06D/RD6.2 EB2	
D704	264P370010	DIODE	1N4148	
D705	264P370010	DIODE	1N4148	G, GT, S, ST

SYMBOL No	PART No	PART NAME	DESCRIPTION	MODELS
D706	264P465040	DIODE	EQA02-12AB/RD13 EB1,B2	
D708	264P370010	DIODE	1N4148	
D709	264P370010	DIODE	1N4148	
D710	264P370010	DIODE	1N4148	
D711	264P370010	DIODE	1N4148	
D7701	264P370010	DIODE	1N4148	GT
D7751	264P682010	VARICAP DIODE	UNITEXT	ST, YT
D792	264P584020	DIODE LE	SML1216W-C,D	
D901	264P376010	DIODE	BYW56	
D902	264P376010	DIODE	BYW56	
D903	264P376010	DIODE	BYW56	
D904	264P376010	DIODE	BYW56	
D905	264P371010	DIODE	BYV95B	
D906	264P372010	DIODE	BYV96E	
D907	264P481060	DIODE	RD3.0 FB2	
D908	264P370010	DIODE	1N4148	
D909	264P481060	DIODE	RD3.0 FB2	
D951	264P378020	DIODE	BYW95B FORMED	
D952	264P377020	DIODE	BYW95B FORMED	
D953	264P377020	DIODE	BYW95B FORMED	
D955	264P461080	DIODE	EQA02-06E/RD6.2 EB3	
D956	266P010020	IC-DIODE	µPC574J-K	
D957	264P464030	DIODE	EQA02-10A/RD10EB2	
FILTERS				
CF101	296P084010	CERAMIC-TRAP	TPS5.5MW(5.5/5.74MHz)	
CF301	296P014020	CERAMIC-FILTER	5.5MHz	
SF101	296P138010	SAW-FILTER	38.9MHz	
SP391	480P030020	SPEAKER		
COILS				
L101	325C165000	COIL-PEAKING	0.82µH-J	
L102	325C161030	COIL-PEAKING	10µH-K	
L104	323P175020	COIL-VIF	REF 38.9MHz	
L106	325C121030	COIL-PEAKING	10µH-K	
L201	321C031040	COIL-RF	10µH-K	
L202	325C120090	COIL-PEAKING	4.7µH-K	
L252	325C120010	COIL-PEAKING	1µH-M	G, GT, S, ST
L253	325C120010	COIL-PEAKING	1µH-M	
L306	325C120070	COIL-PEAKING	3.3µH-K	
L307	325C120070	COIL-PEAKING	3.3µH-K	
L308	325C120070	COIL-PEAKING	3.3µH-K	G, GT, S, ST
L309	325C120070	COIL-PEAKING	3.3µH-K	G, GT, S, ST
L310	325C120070	COIL-PEAKING	3.3µH-K	G, GT, S, ST
L312	325C120070	COIL-PEAKING	3.3µH-K	
L313	325C120070	COIL-PEAKING	3.3µH-K	
L314	325C120070	COIL-PEAKING	3.3µH-K	
L401	411P001070	LEAD-FERRITE		
L501	409P006080	COIL-FILTER	6800µH-J	

SYMBOL No	PART No	PART NAME	DESCRIPTION	MODELS
L502	321C030010	COIL-RF	1μH-K	
L503	411D009020	CORE-FERRITE		
L551	333P012030	COIL-HORIZ-LIN		
L701	325C121070	COIL PEAKING	22μH-K	
L702	325C121070	COIL PEAKING	22μH-K	
L7701	325C120010	COIL PEAKING	1μH-M	GT
L7702	325C120070	COIL PEAKING	3.3μH-K	GT
L7751	325C121030	COIL PEAKING	10μH-K	ST, YT
L7752	325C121030	COIL PEAKING	10μH-K	ST, YT
L7753	325C121030	COIL PEAKING	10μH-K	ST, YT
L7754	409P839010	TUNING COIL		ST, YT
L901	321C030050	COIL-RF	2.2μH-K	
L903	411P001070	LEAD-FERRITE		
L905	411P001070	LEAD-FERRITE		
L951	325D059060	COIL-PEAKING	390μH-K	
L991	351P047020	LINE-FILTER		
L993	351P011020	LINE-FILTER		
⚠	409P564060	DEGAUSSING-COIL		
TRANSFORMERS				
⚠ T551	334P232020	TRANS-FLYBACK		
T552	336P017010	TRANS-HORIZ-DRIVE SRW16/14PS04		
T901	350P664010	TRANS-POWER		
VARIABLE RESISTORS				
VR101	127C380080	VR-SEMIFIXED	1/5W B10K-M	
VR951	127C380080	VR-SEMIFIXED	1/5W B10K-M	
RESISTORS				
⚠ R352	103P378060	R-FUSE	1/4W 3.3-J	
R508	102P243020	R-CEMENT-METAL-SUS	5W 3.9K-K or J	
R511	102P229010	R-CEMENT-WIRE-SUS	10W 8.2-K or J	
⚠ R512	103P442020	R-FUSE-METAL	1W 560-K or J	
⚠ R513	103P398040	R-FUSE	1/2W 2.2-J	
⚠ R514	103P397090	R-FUSE	1/2W 0.82-J	
⚠ R516	103P397090	R-FUSE	1/2W 0.82-J	
⚠ R671	103P448020	R-FUSE-METAL	1W 1.5-K or J	
R921	109D074010	R-CEMENT-METAL	5W 1.8K-K or J	
⚠ R981	109D021020	R-COMPOSITION	1/2W 6.8M-K	
⚠ R982	109D021020	R-COMPOSITION	1/2W 6.8M-K	
R991	102P087040	R-CEMENT-WIRE	10W 4.7-K	
CAPACITORS				
C5B3	172P942030	C-M-PLASTIC-PP	2000V, 8200pF-J	G, GT, S, ST
C904	185D059040	C-ELECTROLYTIC	385V/400V 150μF-M	
⚠ C981	189P091010	C-CERAMIC-AC	AC400V E4700pF-M	
⚠ C991	189P117030	C-M-POLYESTER-AC	AC275V 0.22μF-M	
SWITCHES				
S701	432P066010	SW-KEY-BOARD		
S702	432P066030	SW-KEY-BOARD		
S703	432P066030	SW-KEY-BOARD		

SYMBOL No	PART No	PART NAME	DESCRIPTION	MODELS
S704	432P066030	SW-KEY-BOARD		
S705	432P066030	SW-KEY-BOARD		
⚠ S991	432C048010	SW-PUSH		
MISCELLANEOUS				
⚠ F991	283D047040	FUSE	T2A	YT
⚠ F991	283D091060	FUSE	T3.15AH	G, GT, S, ST
J251	452C080020	21 PIN-SCART	035-098-4505	
J252	452C080020	21 PIN-SCART	035-098-4505	G, GT, S, ST
⚠ J601	449C126010	CRT SOCKET	033-055044	
⚠ PC951	268P068010	PHOTO COUPLER	TCDT1124G	
⚠ RP991	265P071050	POSISTOR	PTH451C41BG180N270A	
TU101	295P430020	TUNER-TV	UV1315/IEC	
X601	285P142020	QUARTZ-CRYSTAL	17.734475MHz	
X701	285P139040	QUARTZ-CRYSTAL	12MHz	
X7701	285P157010	QUARTZ-CRYSTAL	27MHz/SAA5246	GT
X7751	285P062030	QUARTZ-CRYSTAL	13.875MHz	ST, YT
Z792	939P580010	UNIT-PREAMP		
⚠ Z951	299P193000	PROTECTOR		
⚠ Z952	299P193010	PROTECTOR		
PCB ASSEMBLIES				
⚠	920A414005	ASSY-PCB-MAIN		G
⚠	920A414006	ASSY-PCB-MAIN		GT
⚠	920A414007	ASSY-PCB-MAIN		YT
⚠	920A414009	ASSY-PCB-MAIN		S
⚠	920A414010	ASSY-PCB-MAIN		ST
⚠	930C899004	ASSY-PCB-VM/CRT		
⚠	930C900003	ASSY-PCB-PWR-SUB		YT
⚠	930C900004	ASSY-PCB-PWR-SUB		G, GT, S, ST
⚠	930C901002	ASSY-PCB-LED		
⚠	930C915001	ASSY-PCB-TEXT		GT
⚠	930C938001	ASSY-PCB-UNITEXT		ST, YT
MECHANICAL AND COSMETIC				
⚠	246C022070	AC-POWER-CORD/PLUG		
	669D218070	SCREW M5x30 SEMS	CRT Fixing	
	669D220030	SCREW M3x10		
	669D221060	SCREW M4x16	Back Cover fixing	
⚠	700C602060	ASSY-BACK-COVER		G
⚠	700C602070	ASSY-BACK-COVER		GT
⚠	700C602080	ASSY-BACK-COVER		YT
⚠	700C603000	ASSY-BACK-COVER		S
⚠	700C603010	ASSY-BACK-COVER		ST
	701D601090	ASSY-CABINET		G
	701D602000	ASSY-CABINET		GT
	701D602030	ASSY-CABINET		S
	701D602040	ASSY-CABINET		ST
	701D602050	ASSY-CABINET		YT

SYMBOL No	PART No	PART NAME	DESCRIPTION	MODELS
	702B888050	ASSY-DOOR		ST
	752C600020	ASSY-DOOR		G, GT, S
	752C603040	ASSY-DOOR		YT
	754C600020	BUTTON POWER		
	761C437010	DOOR-CATCH		
ACCESSORIES AND PACKING				
	290P054030	TRANSMITTER-REMOCON		YT
	290P054050	TRANSMITTER-REMOCON		G, GT, S, ST
	801C284020	PACKING-CASE		
	803A342010	CUSHION SET		
	831D296020	PACKING-BAG		
	871C600080	SERVICE MANUAL		
	872C122040	IB-COLOUR		G, GT
	872C122050	IB-COLOUR		YT
	872C122070	IB-COLOUR		S, ST

4 SCHEMATIC DIAGRAMS

4.1 SERVICING PRECAUTIONS

The ⚠ symbol indicates components with characteristics critical to safety and performance.

These parts **must** only be replaced with parts having identical values and characteristics – refer to the Service Parts List for the correct Mitsubishi part numbers.

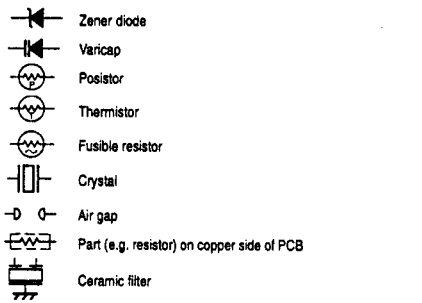
Do not compromise the safety of the receiver by improper servicing.

4.2 GENERAL NOTES

- DC voltages are measured from the points indicated to circuit ground.
- Waveforms are for a PAL colour bar signal.
- Test Points are shown as: "TP6A", etc.
- This is a basic circuit diagram – receivers are subject to modification due to continuous engineering improvement.

4.3 COMPONENT INFORMATION

SPECIFIC SYMBOLS



RESISTORS

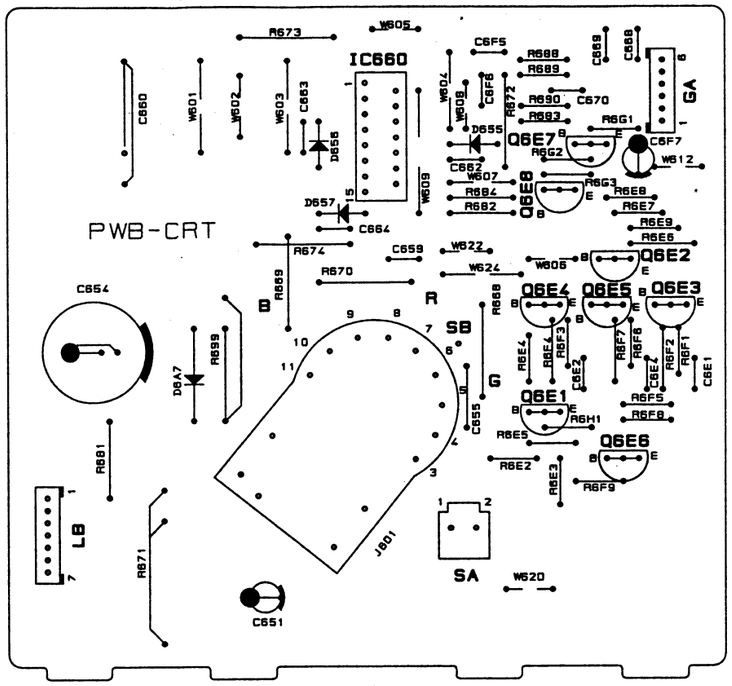
Value	without spec.	Ω, K = KΩ, M = MΩ
Wattage	without spec.	1/4W or 1/6W (chips: 1/10W)
Tolerance	without spec.	±5%
		D = ±0.5%, F = ±1%, J = ±5%, K = ±10%,
Type	without spec.	Carbon film
	(S)	Composition
	(MB)	Metal oxide film
	(CE)	Cemented
	(W)	Wire wound
	(M)	Metal film
	(MPC)	Metal plate cement
	(ML)	Metal linear

CAPACITORS

Value	without spec.	pF for values >1, µF for values <1
Voltage	without spec.	50V
Tolerance	without spec.	electrolytic: ±20%, others ±10%
		G = ±2%, J = ±5%, K = ±10%, M = ±20%, P = +100 -0%, Z = +80 -20%, Q = +30 -10%, T = +200 -0%, C = ±0.25pF, D = ±0.5, F = ± 1pF, G = ±2pF
Type	without spec.	Ceramic
	(MF)	Polyester
	(PP)	Polypropylene film
	(ALM)	Aluminus electrolytic
	(TF)	Twin film
	(SC)	Semiconductor ceramic
	(MP)	Metalised paper
	(MPP)	Metalised plastic film
	(MMF)	Metalised polyester
	(MF.PP)	Polyester/polypropylene film
	(PS)	Polystyrene (styrol)
	(TAN) or (TANT)	Tantalum
		Electrolytic
	(BP) or (NP)	Non-polarised electrolytic
Characteristic	(only ceramic capacitors)	
	without spec.	B or F (high dielectric)
	CH, SL, etc.	Temperature compensating types

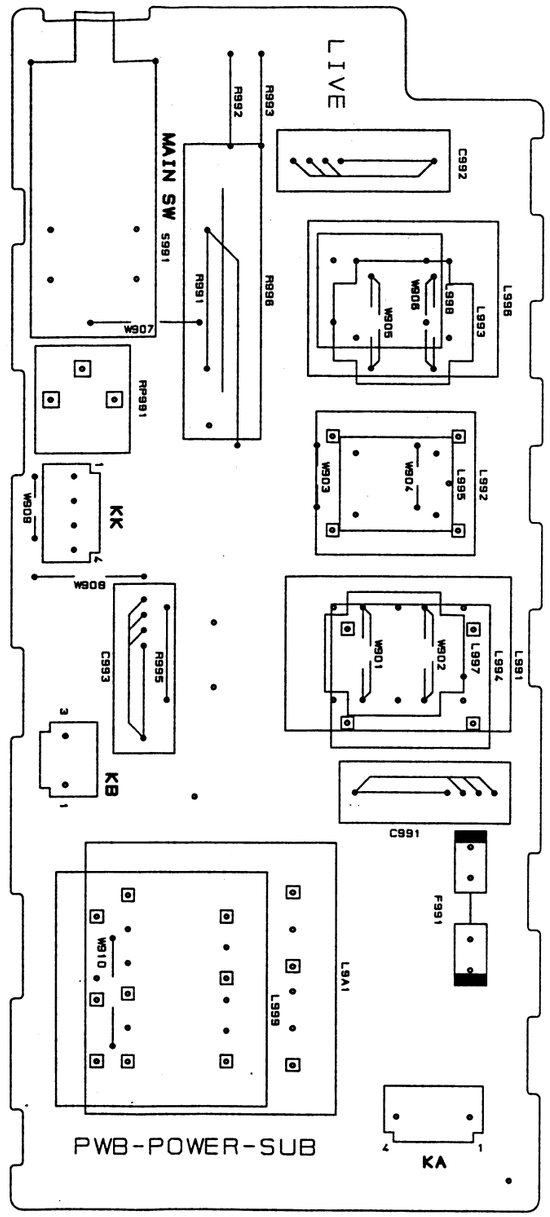
PCB CRT

- IC660
- Q6E1
- Q6E2
- Q6E3
- Q6E4
- Q6E5
- Q6E6
- Q6E7
- Q6E8
- D655
- D656
- D657
- D6A7
- R671
- R671
- J601



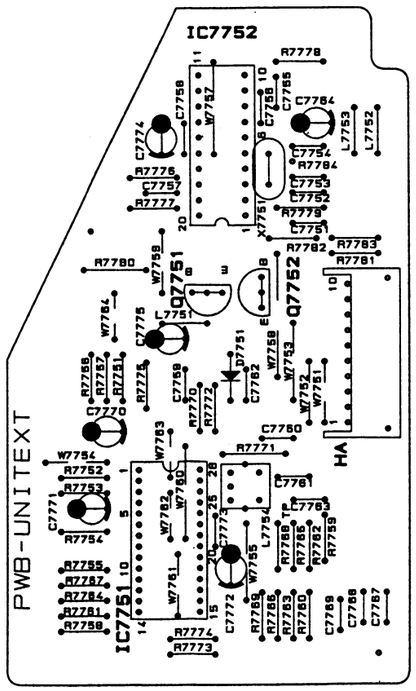
PCB POWER SUB

- RP991
- L991
- L992
- L993
- L994
- L995
- L996
- L997
- L998
- R991
- C991
- C993
- S991
- F991



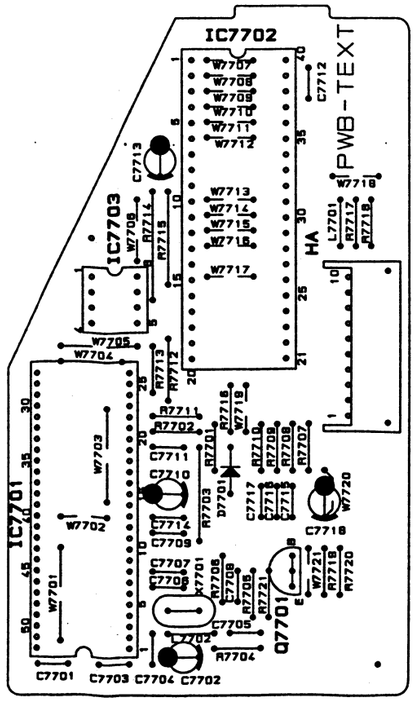
PCB UNITEXT

- IC7751
- IC7752
- Q7751
- Q7752
- D7751
- L7751
- L7752
- L7753
- L7754
- X7751



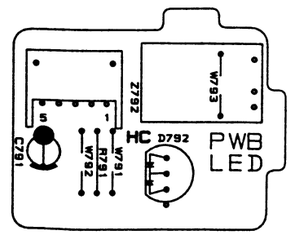
PCB TEXT

- IC7701
- IC7702
- Q7701
- D7701
- L7701
- L7702
- X7701

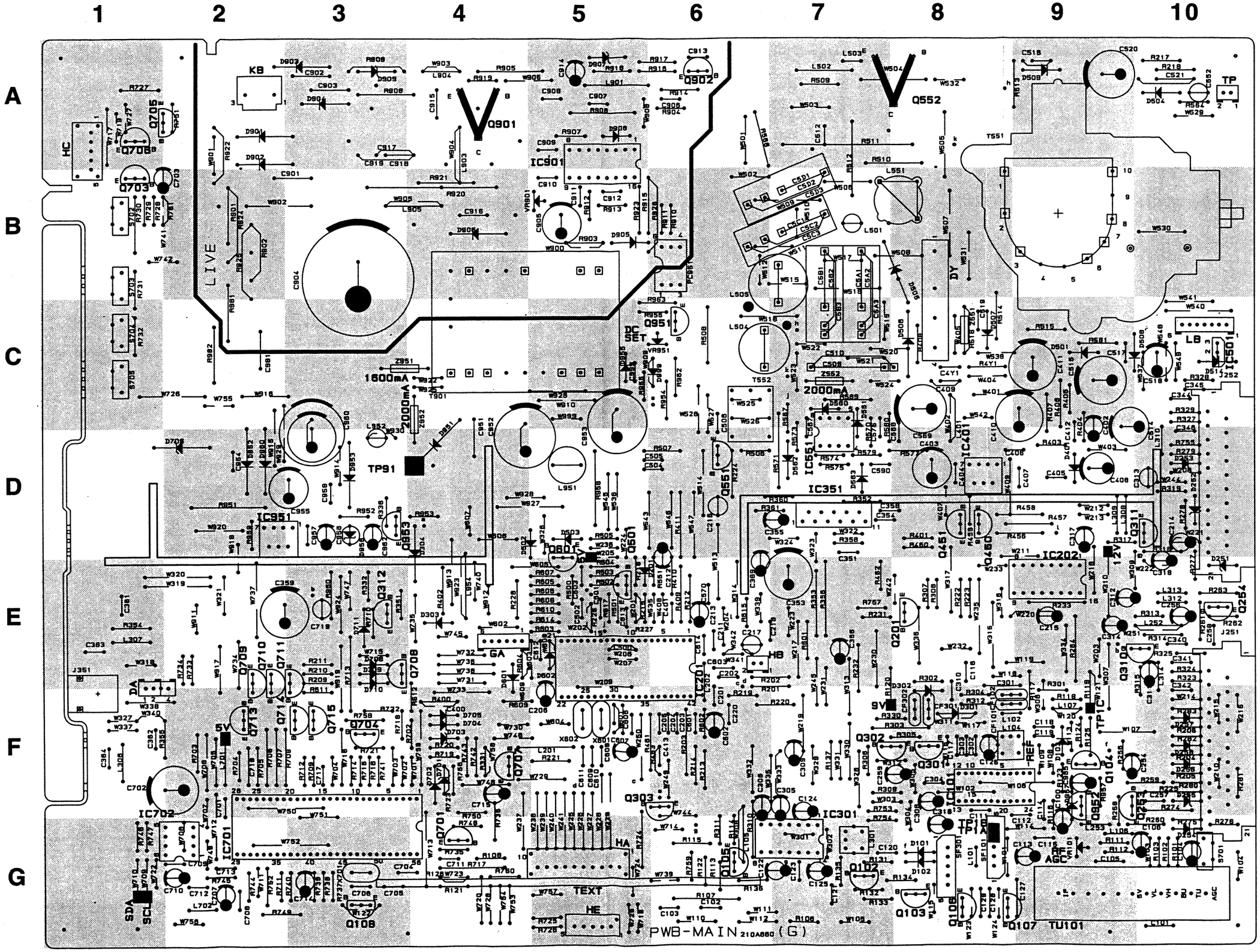


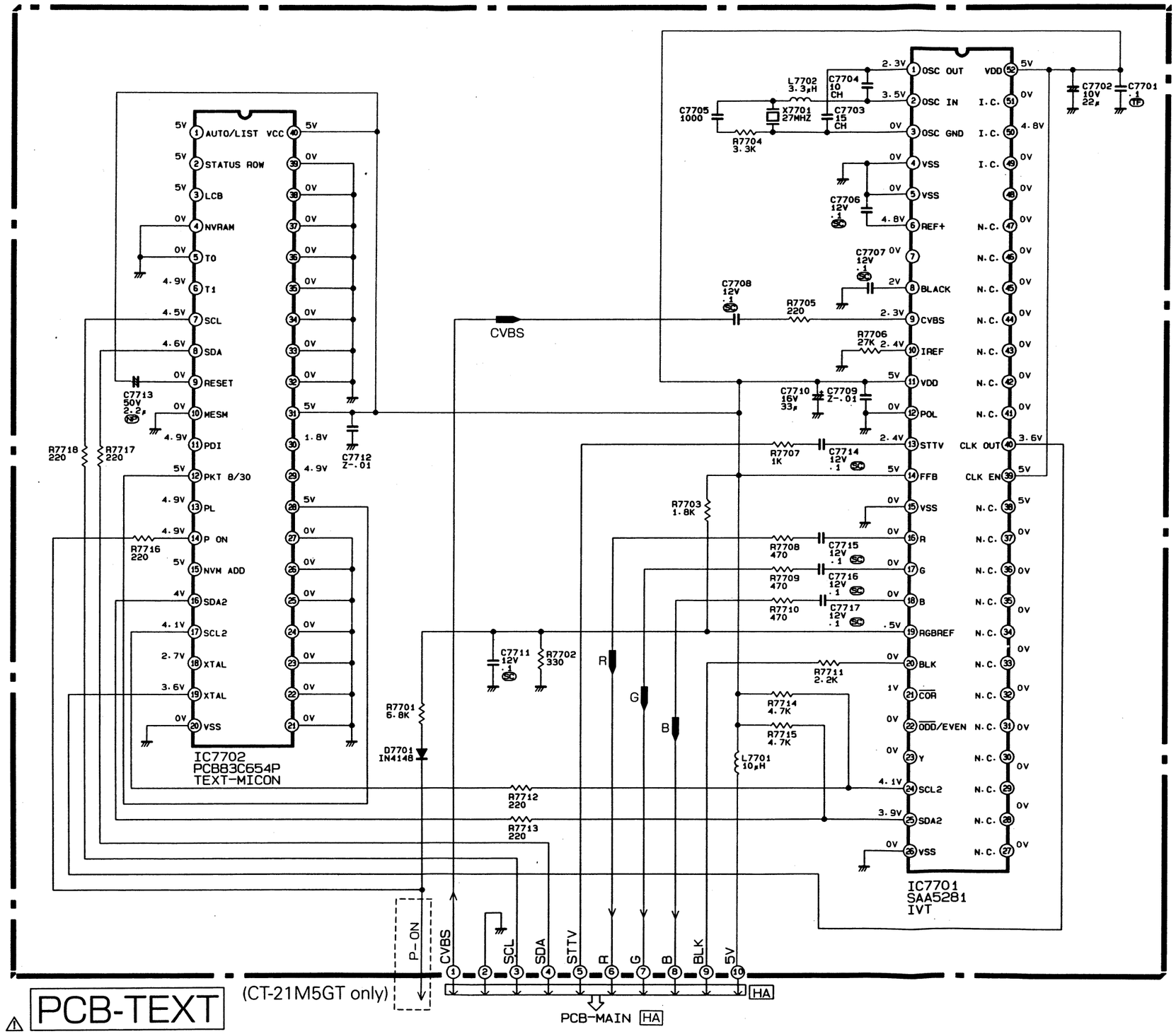
PCB LED

- D792
- Z792



PCB-MAIN

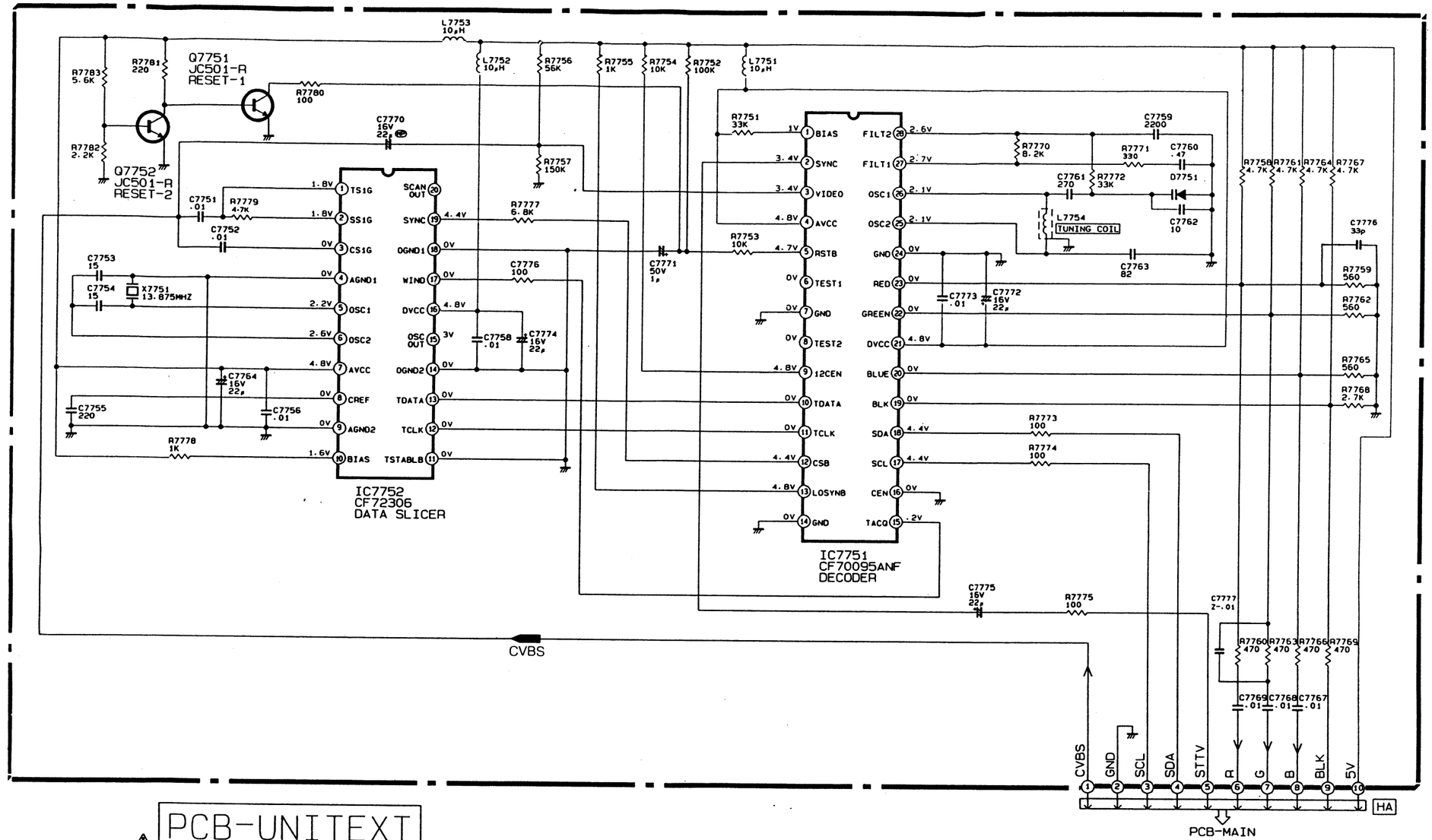

1 2 3 4 5 6 7 8 9 10
A B C D E F G
KB
HC
HA
HB
HE
DA
DB
GA
LB
TP
LIVE
DC SET
Q901
Q902
Q951
Q552
Q705
Q706
Q703
IC901
IC351
IC401
IC551
IC202
IC701
IC702
IC301
IC851
Q601
Q501
Q451
Q460
Q311
Q312
Q709
Q710
Q711
Q713
Q714
Q715
Q704
Q707
Q708
Q303
Q302
Q201
Q310
Q105
Q106
Q103
Q107
Q108
Q254
Q253
Q952
Q551
Q353
TU101
T551
T552
T901
T501
1600mA
2000mA
2000mA
TP91
TEXT
REF
AGC
12V
9V
5V
PWB-MAIN 210A860 (G)



(CT-21M5GT only)

⚠ PCB-TEXT

(CT-21M5GT,CT-21M5YT only)

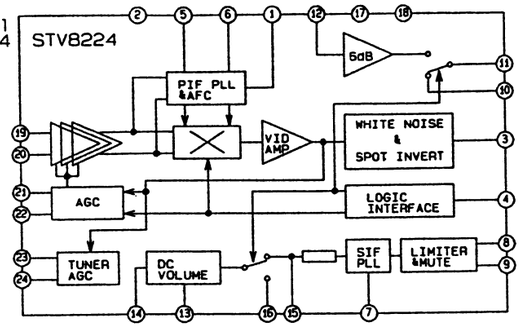


⚠ PCB-UNITEXT

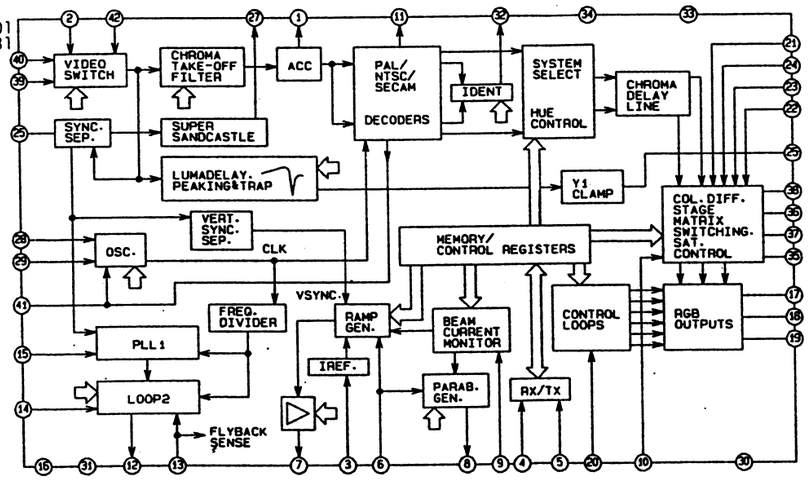
(CT-21M5ST only)

CT-21M5G
CT-21M5GT
CT-21M5S
CT-21M5ST
CT-21M5YT

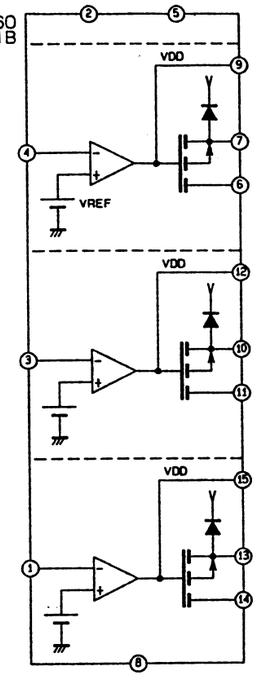
IC101
STV8224



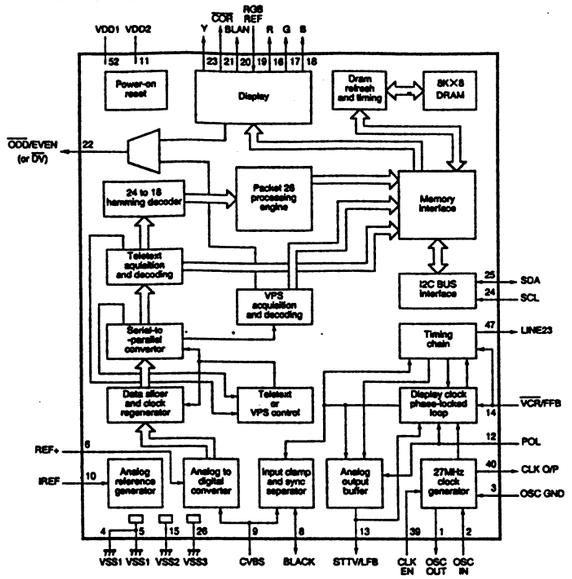
IC201
MC44031



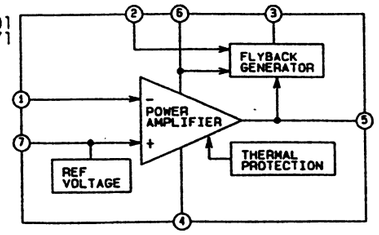
IC660
TEA5101B



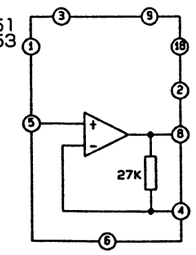
IC7701 SAA5281



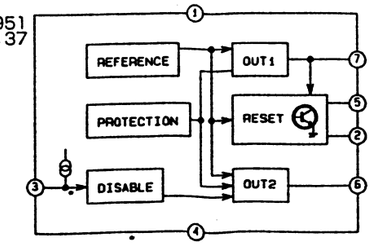
IC401
TDA8171



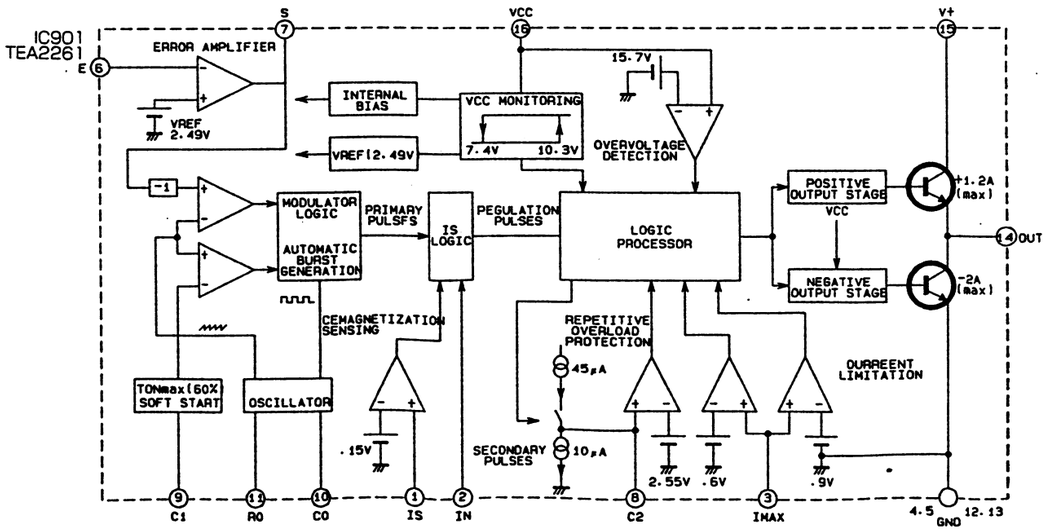
IC351
TDA7253



IC951
TDA8137



IC901
TEA2261

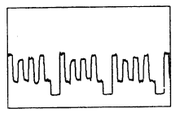


①2.0Vp-p(H) ②1.0Vp-p(H) ③1.5Vp-p(H) ④1.6Vp-p(H)

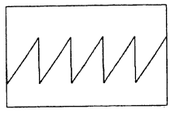
Q106 BAND-SW1
Q107 BAND-SW2
Q108 BAND-SW3
Q701 TU-PULSE-AMP
TU101 UV1315H
IF
AV2
AV1
AUDIO
CVBS
5V
9V
Q254 JC501-R VIDEO-OUT-2
Q253 JC501-R VIDEO-OUT-1
Q311 JC501-R AUDIO-OUT-2
Q310 JC501-R AUDIO-OUT-1
IC202 HEF40538P AV-SW
Q105 JC501-R IF-AGC-BUFFER
IC101 STV8224 VIF/SIF
Q201 JC501-R AV1/AV2-SW
Q303 MAINS-OFF -MUTE-2
Q312 JC501-R MUTE
Q707 JC501-R BLK-2
Q952 2SC2236-Y 9V-REG
IC201 MC44031 VCJ
IC702 E²PROM
IC701 MICON
Q703 JA101-Q SW-PROTECT
CF101 5.5MHZ
CF301 5.5MHZ
SF101 61966M
REF-COIL
RF-AGC
(35·36·37)
(8·19)

9 10 11 12 13 14 15 16

)1.6Vp-p(H)

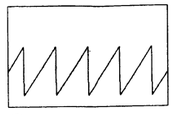


⑤1.7Vp-p(H)

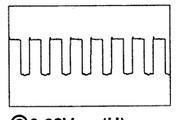


⑥1.9Vp-p(V)

⑦2.0Vp-p(V)



⑧0.62Vp-p(H)



⚠PCB-MAIN

SCHEMATIC DIAGRAM
CT-21M5G
CT-21M5GT
CT-21M5S
CT-21M5ST

VARIATION TABLE

	Q202	R208	W209	**	R221
21M5G				○	○
21M5GT	○	○			
21M5S				○	○
21M5ST			○		

IC351
TDA7253
AUDIO-AMP

AUDIO

SP391

Q202

R208 4.7K

CVBS

ST-BY 5V

5V

W209

Q711 JC501-R B-OSD

Q710 JC501-R G-OSD

Q709 JC501-R R-OSD

Q714 JC501-Q OSD-BLK -B

Q715 JC501-Q OSD-BLK -G

Q713 JC501-Q OSD-BLK-R

P-ON (CT-21M5GT only)

CVBS
GND
SCL
SDA
STTV
R-OUT
G-OUT
B-OUT
BLK
+5V

HA

⚠PCB-TEXT CT-21M5GT

⚠PCB-UNITEXT CT-21M5ST

Q501 JC501-R H-DRIVE-1

Q708 JC501-R SHADOW-SW

GA

⚠PCB-CRT

IC660
TEA5101B
CRT-DRIVER

⑬0.86Vp-p(H)

⑭0.92Vp-p(H)

⑮1.3Vp-p(H)

IC701
MICON

IC702
E²PROM

IC201
MC44031
VCJ

IC951
TDA8137
5V-REG

IC901
TEA2261
REG CONT

Q201
JC501-R
AV1/AV2-SW

Q312
JC501-R
MUTE

Q707
JC501-R
BLK-2

Q953
JC501-R
MAINS-OFF-MUTE-1

Q703
JA101-Q
SW-
PROTECT

Q704
JC501-R

Q705
LED-SW-1

Q706
LED-SW-2

Q902
SLOW-START

Q901
S2000
REG OUT

Q951
ERROR AMP

X701
12MHz

S702
ST-BY

S703
CH/VOL

S704

S705

S701
SERVICE

D702
EQA02
-05C

D703

D704
1N4148

D705
1N4148

D701
EQA02
-05C

D706

D707
RD3.0FB2

D708
1N4148

D709
RD3.0FB2

D711

D901-D904
BYW56

D902

D903
1N4148

D904

D905

D906
BYV96E

D907
RD3.0FB2

D908
1N4148

D909
RD3.0FB2

D951
BYW96E

D952
BYW56

D953
BYW56

D304
1N4148

D502
1N4148

Z792
UNIT PRE-AMP

Z951
2000

Z952
2000

T901

L702

L903

L905

L951
380μH

L993

L991

F991

S991

RP991

VR951
DC-SET

KK

KB

KA

HC

HE

SCK

SDA

AV1

AV2

ACL

ITEM
NEUTRAL (BLUE)
LIVE (BROWN)

LIVE

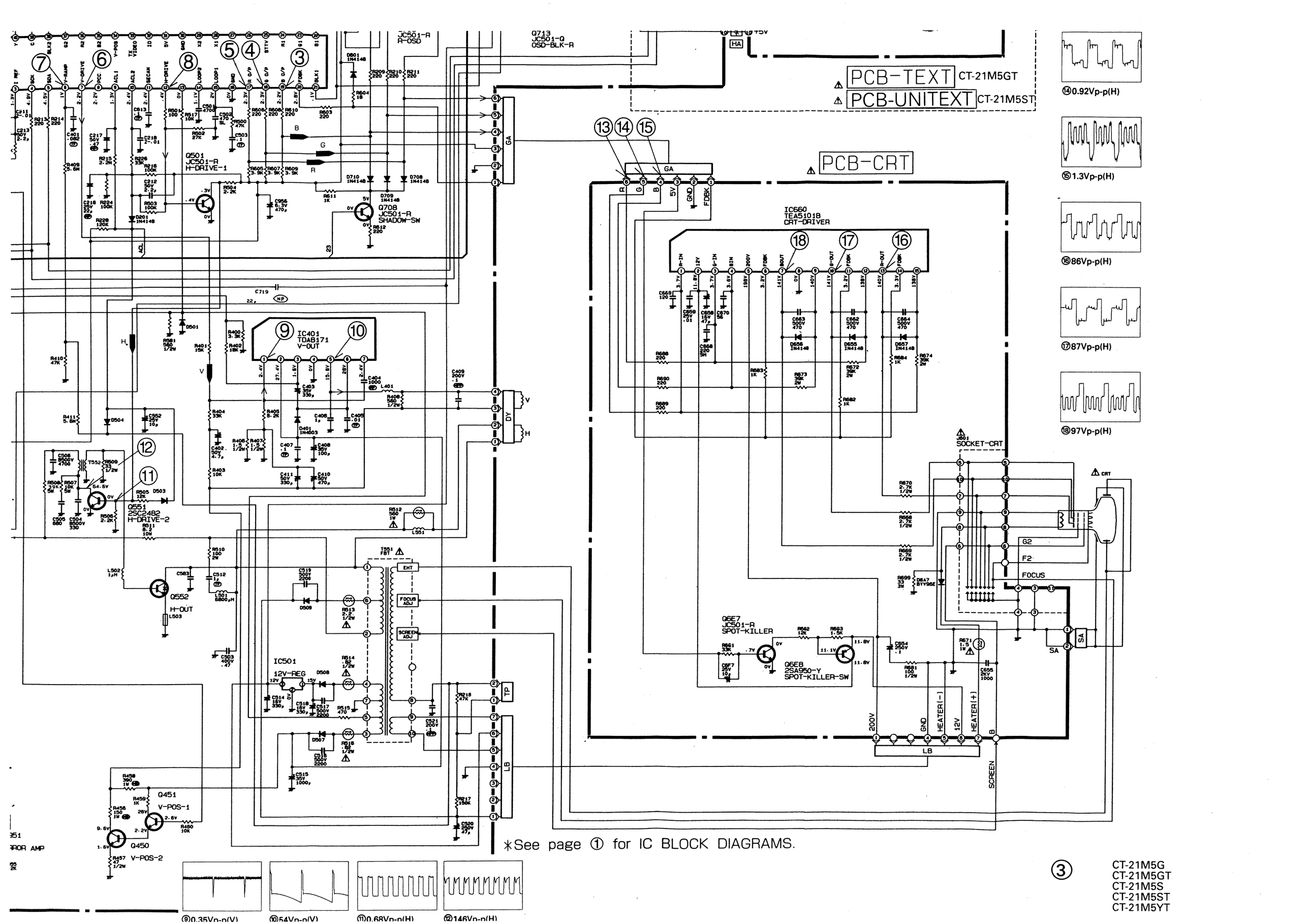
COLD

ST-BY 5V

-MUTE-2

PCB-POWER-SUB

PCB-LED/PRE-AMP



⑭0.92Vp-p(H)

⑮1.3Vp-p(H)

⑯86Vp-p(H)

⑰87Vp-p(H)

⑱97Vp-p(H)

⑨0.35Vp-p(V)

⑩54Vp-p(V)

⑪0.68Vp-p(H)

⑫146Vp-p(H)

*See page ① for IC BLOCK DIAGRAMS.

③

CT-21M5G
CT-21M5GT
CT-21M5S
CT-21M5ST
CT-21M5YT

①2.0Vp-p(H) ②1.0Vp-p(H) ③1.5Vp-p(H) ④1.6Vp-p(H)

Q106 BAND-SW1
Q107 BAND-SW2
Q108 BAND-SW3
Q701 TU-PULSE-AMP
TU101 U1315H
IF
5V
9V
AUDIO
CVBS
Q253 JC501-R VIDEO-OUT
Q310 JC501-R AUDIO-OUT
Q105 JC501-R AGC BUFFER
IC101 STV8224 VIF/SIF
RF-AGC
REF-COIL
Q303 JC501 MAINS-OFF →MUTE-2
Q312 JC501-R MUTE
Q707 JC501-R BLK-2
IC702 E²PROM
IC201 MC44031 VCJ
Q952 2SC2236-Y 9V-REG
AV1
Q703 JA101-Q SW-PROTECT
IC701 ST9291N6 MICON
S702 ST-BY
S703 CH/VOL
S704
S705
D706
(35·36·37)
(8·19)

④1.6Vp-p(H) ⑤1.7Vp-p(H) ⑥1.9Vp-p(V) ⑦2.0Vp-p(V) ⑧0.62Vp-p(H)

⚠ PCB-MAIN

SCHEMATIC DIAGRAM
CT-21M5YT

IC351 TDA7253 AUDIO-AMP

AUDIO

CVBS

ST-BY 5V

5V

BLK

Q711 JC501-R B-OSD

Q710 JC501-R G-OSD

Q709 JC501-R R-OSD

Q713 JC501 OSD-BLK-R

Q714 JC501 OSD-BLK -B

Q715 JC501 OSD-BLK -G

Q501 JC501-R H-DRIVE-1

Q708 JC501-R SHADOW-SW

J351

SP391

⚠ PCB-UNITEXT

CVBS GND SCL SDA STTV R G B BLK +5V

⚠ PCB-CRT

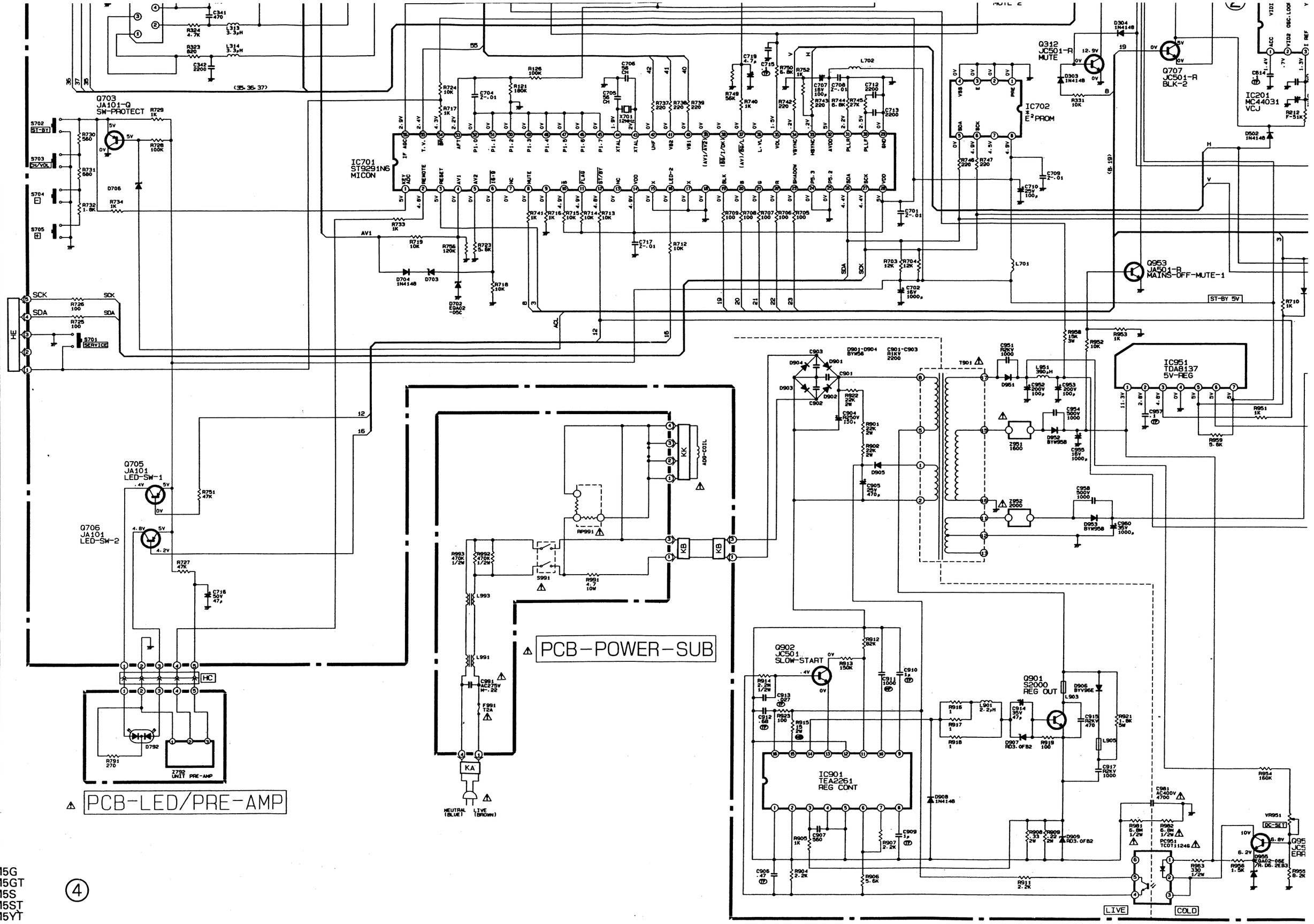
IC660 TEA5101B CRT-DRIVER

⑬0.86Vp-p(H)

⑭0.92Vp-p(H)

⑮1.3Vp-p(H)

⑯86Vp-p(H)



-21M5G
-21M5GT
-21M5S
-21M5ST
-21M5YT

PCB-UNITEXT

PCB-CRT

IC201
MC44031
VCJ

Q501
JC501-R
H-DRIVE-1

Q708
JC501-R
SHADOW-SW

IC401
TDAB171
V-OUT

Q551
2SC2482
H-DRIVE-2

Q552
H-OUT

IC501
12V-REG

Q451
V-POS-1

Q450
V-POS-2

Q951
JC501
ERROR AMP

IC660
TEA5101B
CRT-DRIVER

Q6E7
JC501-R
SPOT-KILLER

Q6E8
2SA950-Y
SPOT-KILLER-SW

SOCKET-CRT

⑨0.35Vp-p(V)

⑩54Vp-p(V)

⑪0.68Vp-p(H)

⑫146Vp-p(H)

⑭0.92Vp-p(H)

⑮1.3Vp-p(H)

⑯86Vp-p(H)

⑰87Vp-p(H)

⑱97Vp-p(H)

*See page ① for IC BLOCK DIAGRAMS.